

What is claimed is:

1        1. A method of modifying parameters of a hard disk drive in accordance with ambient  
2 temperature, comprising the steps of:

3              updating temperature information by sensing the ambient temperature in a hard disk drive  
4 during a particular mode of operation of the hard disk drive;

5              making a determination that an excessive temperature exists when the updated temperature  
6 information falls outside of a critical temperature range; and

7              when the updated temperature information falls outside of said critical temperature range,  
8 changing values of a plurality of write and read parameters influencing performance of said hard disk  
9 drive that are affected by thermal variation, to compensate for changes in the performance of the hard  
10 disk drive due to said excessive temperature, in dependence upon relationships between said write  
11 and read parameters and said thermal variation.

1        2. The method of claim 1, further comprised of applying electrical power to functionally  
2 operate said hard disk drive during said idle mode.

1        3. The method of claim 1, further comprised of updating the temperature information at  
2 regular intervals having predetermined periods.

1        4. The method of claim 1, further comprised of:

2 assigning to each of said parameters a corresponding standard value;  
3 applying each said standard value during operation of said hard disk drive while the  
4 temperature information lies within said critical temperature range;

5 when the updated temperature information falls below a lower limit of the critical  
6 temperature range, changing each said standard value in dependence upon a low-temperature  
7 compensation parameter value; and

8 when the updated temperature information rises above an upper limit of the critical  
9 temperature range, changing each said standard value in dependence upon a high-temperature  
10 compensation parameter value.

11 5. The method of claim 1, further comprised of responding to said determination that an  
12 excessive temperature exists by determining said values in dependence upon an amount by which  
13 the updated temperature information exceeds the critical temperature range.

14 6. The method of claim 1, further comprised of adjusting one or more of said write and read  
15 parameters comprised of a write current determination factor, a write booster determination factor  
16 and a write precomp factor, and a read bias current factor, when changing said values of said write  
17 and read parameters.

18 7. The method of claim 1, further comprised of:  
19 changing said values by individually adjusting said values of the plurality of write and read

3       parameters independently from one another when the updated temperature information falls outside  
4       of said critical range.

1           8. The method of claim 1, further comprised of:

2           changing said values of several of said plurality of write and read parameters may be adjusted  
3       together and *en masse*, with adjustment of each of said values of said several parameters being  
4       simultaneously adjusted in dependence upon said excessive temperature and said adjustment of  
5       others of said values of said several parameters.

1           9. An apparatus for determining parameters of a hard disk drive under ambient  
2       temperature, comprising:

3           a memory storing information representing a plurality of parameters that influence  
4       performance of said hard disk drive and temperature information representing ambient temperature  
5       in the hard disk drive;

6           a temperature sensor disposed to detect the ambient temperature in the hard disk drive; and

7           a controller storing in said memory updated temperature information representing the  
8       ambient temperature detected by the temperature sensor during a particular operational mode of the  
9       hard disk drive, detecting an excessive temperature by comparing the updated temperature  
10      information and a critical temperature range and compensating for variations in said performance  
11      of the disk drive attributable to the excessive temperature by adjusting values of write and read  
12      parameters affected by thermal variation to correspond to the excessive temperature when the

13        updated temperature lies outside of the critical temperature range.

1            10.      The apparatus of claim 9, further comprised of updating said temperature information  
2        while said hard disk drive is in an idle mode a power-on state with electrical power applied to  
3        functionally operate the hard disk drive.

1            11.      The apparatus of claim 9, further comprised of said controller updating the  
temperature information that is detected by the temperature sensor at regular intervals each having  
a predetermined period.

1            12.      The apparatus of claim 9, further comprised of said controller determining said  
values corresponding to the excessive temperature to include an amount by which the updated  
temperature information exceeds the critical temperature range in accordance with an equation.

1            13.      The apparatus of claim 9, further comprised of said controller determining said  
values corresponding to the excessive temperature to include an amount by which the updated  
temperature information exceeds the critical temperature range.

1            14.      The apparatus of claim 9, further comprised of said memory storing write and read  
parameters for writing, including a write current determination factor, a write booster determination  
factor and a write precomp factor, and parameters a read bias current factor.

1       15. The apparatus of claim 9, further comprised of:

2               said memory storing for each of said parameters a corresponding standard value; and  
3               said controller:

4                       applying each said standard value during operation of said hard disk  
5                       drive while the temperature information lies within said critical temperature range;

6                       when the updated temperature information falls below a lower limit  
7                       of the critical temperature range, changing each said standard value in dependence  
8                       upon a low-temperature compensation parameter value; and

9                       when the updated temperature information rises above an upper limit  
10                      of the critical temperature range, changing each said standard value in dependence  
11                      upon a high-temperature compensation parameter value.

1       16. The apparatus of claim 9, further comprised of said controller adjusting said values by

2       individually changing said values of the plurality of write and read parameters independently from  
3       one another when the updated temperature information falls outside of said critical range.

1       17. The apparatus of claim 9, further comprised of said controller adjusting said values of  
2       several of said plurality of write and read parameters by changing said values of said several  
3       parameters together and *en masse*, with adjustment of each of said values of said several parameters

4 being simultaneously changed in dependence upon said excessive temperature and changes of values  
5 of others of said several parameters.